


# Hazardous Waste Minimization and Pollution Prevention

There are a variety of methods to deal with the challenges of hazardous waste.

<p>Most Desirable</p>  <p>Least Desirable</p>	<ul style="list-style-type: none"><li>• Reduce waste production at the source</li><li>• Recycle and reuse waste on-site</li><li>• Recycle off-site</li><li>• Treatment</li><li>• Dispose of waste in a manner that protects the environment and human health and safety</li></ul>
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The most preferable option is to reduce the amount of waste that is produced in the first place. This approach known as source reduction, means that no one has to deal with the waste at all. This is the cornerstone of pollution prevention.

## Chemical Purchasing

Effective waste minimization begins with effective purchasing decisions. The idea is to buy only what you need. If you don't buy it, you don't have to dispose of it.

Many labs have an inventory of unused chemicals left over by former researchers. They may be useless or even unstable because their shelf life has expired. Unused chemicals can present a safety hazard in the lab and are expensive to dispose.

## The Myth of Buying in Bulk

All researchers estimate the quantity of a chemical that they'll need before purchasing the chemical. Problems arise when these estimates are inaccurate. The simplest way is to estimate the quantity of a chemical that you'll need for a single experiment. This estimate is likely to be more accurate than an estimate of how much you'll need for an entire year. An important fact to consider is that the cost savings associated with buying in bulk are frequently offset by the costs of disposing of the unused chemicals.

## Conducting Experiments

Waste minimization in the laboratory doesn't necessarily require major changes in the way experiments are performed. Some basic efforts to be more efficient with experimental procedures can substantially reduce the amount of waste generated.

A starting point for waste minimization is being efficient in your use of resources:

1. Have students use solvents and other hazardous materials sparingly.
2. Monitor experimental reactions closely and add additional chemicals only as necessary.
3. Emphasize water conservation by reducing rinse times where possible.
4. Be alert for opportunities to save electricity. For example, don't leave equipment running when it's not being used.

Reduce the scale of experiments and associated quantities of chemicals where possible or move to microscale chemistry.

Use laboratory detergents rather than hazardous cleaning baths (e.g., substitute detergents for chromic acid solutions). Also, use non-halogenated and less toxic solvents rather than halogenated solvents.